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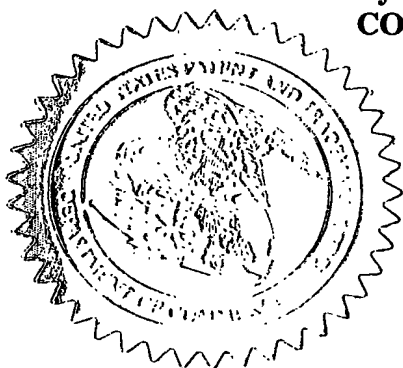
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By Authority of the
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PROVISIONAL APPLICATION FOR PATENT COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

Express Mail Label No.

EL692649042US

INVENTOR(S)

Given Name (first and middle (if any))	Family Name or Surname	Residence (City and either State or Foreign Country)
G. Eric Engstrom Peter	Engstrom Zatloukal	Kirkland, Washington Kirkland, Washington

☐ Additional inventors are being named on the _____ separately numbered sheets attached hereto**TITLE OF THE INVENTION (500 characters max)**

A Wireless Mobile Phone With Authenticated Mode of Operation Including Photo Based Authentication

Direct all correspondence to:

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ENCLOSED APPLICATION PARTS (check all that apply)

Specification Number of Pages

16



CD(s), Number



Drawing(s) Number of Sheets

9



Other (specify)



Application Data Sheet. See 37 CFR 1.76

Return receipt postcard

METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT

Applicant claims small entity status. See 37 CFR 1.27.



A check or money order is enclosed to cover the filing fees



The Commissioner is hereby authorized to charge filing fees or credit any overpayment to Deposit Account Number:

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Payment by credit card. Form PTO-2038 is attached.

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\$160.00

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.



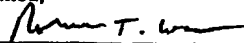
No.



Yes, the name of the U.S. Government agency and the Government contract number are: _____

Respectfully submitted,

SIGNATURE



TYPED or PRINTED NAME Robert T. Watt

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Date

03/28/2003

REGISTRATION NO.
(if appropriate)
Docket Number:

45,890

109909-132416

USE ONLY FOR FILING A PROVISIONAL APPLICATION FOR PATENT

This collection of information is required by 37 CFR 1.51. The information is used by the public to file (and by the PTO to process) a provisional application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 8 hours to complete, including gathering, preparing, and submitting the complete provisional application to the PTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, Washington, D.C. 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Box Provisional Application, Assistant Commissioner for Patents, Washington, D.C. 20231.

PROVISIONAL APPLICATION FOR UNITED STATES PATENT

FOR

**A WIRELESS MOBILE PHONE WITH AUTHENTICATED MODE OF
OPERATION INCLUDING PHOTO BASED AUTHENTICATION**

Inventors

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A WIRELESS MOBILE PHONE WITH AUTHENTICATED MODE OF OPERATION INCLUDING PHOTO BASED AUTHENTICATION

FIELD OF THE INVENTION

5 The present invention relates to the field of wireless mobile phones. More specifically, the present invention is related to a wireless mobile phone having an authenticated mode of operation available only to an authenticated user, in particular, a user authenticated via a photograph of the user's.

BACKGROUND OF THE INVENTION

10 Advances in microprocessor and telecommunication technology have led to wide spread deployment and adoption of mobile devices, such as wireless mobile phones. For wireless mobile phones, in addition to wireless telephony, the late models are often equipped with advanced capabilities, such as calendar,
15 address book, access to the World Wide Web (WWW), emails, and so forth.

 Much of these functionalities are designed to increase the productivity of business users. As a result, it is not surprising that business users constitute a major user segment of wireless mobile phones, especially for the high-end function rich models. Increasingly, more business data, such as business
20 contact information, business plans, sales/marketing strategies, financial reports, and so forth, are being stored on wireless mobile phones.

 However, unlike personal computers or other computing devices, where user authentication, through e.g. user log-in, are routinely provided with virtually all operating systems, few if any operating systems of wireless mobile phones
25 provide means to authenticate users. As a result, under the prior art, wireless

mobile phones are at risk of unauthorized usage, as well as data being compromised by unauthorized accesses.

Thus, it will be desirable if protection against unauthorized access of user data and/or usage of wireless mobile phones can be provided.

5

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be described by way of exemplary embodiments, but not limitations, illustrated in the accompanying drawings in which like references denote similar elements, and in which:

10 **Figure 1** illustrates a front view of a wireless mobile phone incorporated with the teachings of the present invention, in accordance with one embodiment;

Figures 2-3 illustrate two architectural views of the wireless mobile phone of **Fig. 1**, in accordance with one embodiment;

15 **Figures 4a-4b** illustrate the operational flow of the relevant aspects of the operating logic of **Fig. 3**, in accordance with one embodiment;

Figure 5 illustrates a front view of another wireless mobile phone incorporated with the teachings of the present invention, in accordance with an alternate embodiment;

20 **Figures 6a-6b** illustrate two perspective views of another wireless mobile phone incorporated with the teachings of the present invention, in accordance with yet another embodiment;

Figures 7a-7b illustrate a front view and a side view of another wireless mobile incorporated with another aspect of the teachings of the present
25 invention, in accordance with yet another embodiment; and

Figures 8a-8b illustrate a front view and a back view of the identity card of Fig. 7b in further detail, in accordance with one embodiment.

5 DETAILED DESCRIPTION OF EMBODIMENTS OF THE INVENTION

The present invention includes a wireless mobile phone having an authenticated mode of operation, available only to an authenticated user, in particular, a user authenticated by a photograph of the user.

10 Parts of the description will be presented in terms commonly employed by those skilled in the art to convey the substance of their work to others skilled in the art. The term "wireless mobile phone" as used herein (in the specification and in the claims) refers to the class of telephone devices equipped to enable a user to make and receive calls wirelessly, notwithstanding the user's movement, as long as the user is within the communication reach of a service or base station
15 of a wireless network service provider. Unless specifically excluded, the term "wireless mobile phone" is to include the analog subclass as well as the digital subclass (of all signaling protocols).

The terms "photograph" and "photo" as used herein are synonymous, and are used interchangeably. Unless the context specifically delineates the
20 "photograph" or "photo" to a particular manifestation, the terms are to include the physical manifestation of the photograph/photo, and/or the data structure/organization incarnation holding the data of the photograph/photo.

In the following description, various aspects of the present invention will be described. However, it will be apparent to those skilled in the art that the
25 present invention may be practiced with only some or all aspects of the present invention. For purposes of explanation, specific numbers, materials and

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configurations are set forth in order to provide a thorough understanding of the present invention. However, it will be apparent to one skilled in the art that the present invention may be practiced without the specific details. In other instances, well-known features are omitted or simplified in order not to obscure the present invention.

Various operations will be described as multiple discrete steps in turn, in a manner that is most helpful in understanding the present invention, however, the order of description should not be construed as to imply that these operations are necessarily order dependent. In particular, these operations need not be performed in the order of presentation.

The phrase "in one embodiment" is used repeatedly. The phrase generally does not refer to the same embodiment, however, it may. The terms "comprising", "having" and "including" are synonymous, unless the context dictates otherwise.

Referring now to **Figures 1 and 3a-3b**, wherein a front view and two architecture (internal component) views of a wireless mobile phone of the present invention, in accordance with one embodiment, are shown. As illustrated, wireless mobile phone **100** of the present invention (hereinafter, simply phone **100**) is advantageously provided with operating logic **240** equipped in particular with security function **242**, to operate phone **100** in at least an unauthenticated mode of operation and an authenticated mode of operation.

While operating in the unauthenticated mode of operation, i.e. without having the user authenticated, operating logic **240** makes available only a limited or reduced set of functions, whereas under the authenticated mode of operation,

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i.e. having the user authenticated, operating logic 240 makes available a more expanded or the entire set of functions.

The exact constitution of the limited/reduced set of functions and the expanded/full set of functions is application dependent, which may vary from
5 embodiments to embodiments. In one embodiment, the limited/reduced set of functions include only the ability to make an emergency call, such as a 911 call, otherwise, no other functions, including but not limited to making other calls, accessing calendar, email, text messaging, viewing and/or storing documents, normal taking of pictures/photographs, and so forth, are permitted. These other
10 functions are available only under the authenticated mode.

In another embodiment, the limited/reduced set of functions may effectively be a null function set, excluding even the ability to make an emergency call, except for notification of the unauthenticated status of the user, and perhaps, inviting the user to authenticate himself/herself, by e.g. allowing a
15 photograph of the user to be captured in real time.

In various embodiments, in addition to the above described unauthenticated and authenticated modes of operation, operating logic 240 further supports a provisioning mode of operation, under which phone 100 is initially provisioned. Under the initial provisioning mode, conventional
20 provisioning, such as configuring phone 100 for a particular wireless carrier, a particular subscriber and so forth, may be performed. Entry into the initial provisioning mode may be effectuated in any one of a number of conventional approaches.

Continue to refer to Figures 1 and 3a-3b, for the illustrated embodiment,
25 phone 100 is further advantageously equipped with camera 132 (including lens 134) to facilitate taking of photographs (while operating in the authenticated

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mode). However, in addition to its conventional use for taking photographs, operating logic 240, or more specifically, security function 242, is endowed to authenticate a user through a photograph of the user (prior to operating phone 100 in the authenticated mode).

5 In particular, as will be described in more detail below, operating logic 240, in general, is equipped to establish a reference photograph of a user for authentication purpose, and automatically invokes camera 132 to capture a photograph of the user real time, during power on or reset. Further, security function 242 is endowed to use the reference and the real time captured
10 photographs of the user to authenticate the user, and determine whether to continue to operate phone 100 in an unauthenticated mode, or operate phone 100 in an authenticated mode.

 In other words, under the present invention, operating logic 240 operates phone 100 in the authenticated mode, and makes available the expanded/full set
15 of functionalities, only if the user has been authenticated by his/her photo, otherwise, phone 100 is operated in the unauthenticated mode with only a limited/reduced set of functionalities (except in the initial provisioning mode).

 For the embodiment, operating logic 240, more specifically, security function 242, also supports the taking of a photograph of the user, and its saving
20 as a reference for subsequent analysis of a taken photograph to authenticate a user, before operating phone 100 in the authenticated mode.

 In various embodiments, the saving of the reference photograph is also supported under a special configuration mode, while operating in the authenticated mode. Entry into the configuration mode (while operating in the
25 authenticated mode) may also be effectuated in any one of a number of conventional means.

Continuing to refer to **Fig. 1** and **3a-3b**, additionally, phone **100** includes conventional wireless telephony elements, including power switch **122**, power **222**, audio communication elements, such as ear speaker **112** and microphone **114**, and non-audio communication elements, such as input key pad **102** having
5 a number of alphanumeric input keys and display **108**. Further, the non-audio input elements may further include scroll button **105**, selection buttons **106**, and "talk" and "end talk" buttons **104**. These elements are disposed on various external surfaces of body **116**.

As illustrated in **Fig. 3a**, upon depression by a user (optionally, for a
10 predetermined duration), while phone **100** is in a powered down or lower power state, power switch **122** couples power **222** to camera **132** and other components **202-212**. Likewise, upon depression by a user (optionally, for a predetermined duration), while phone **100** is in powered up state, power switch **122** cuts off or reduces power **222** to all or selected ones of camera **132** and
15 other components **202-212**.

Externally, phone **100** may also include antenna **110**. Keys of key pad **102** may be surrounded by, or otherwise include illuminable light emitting diodes (LED) in their backgrounds. For the purpose of the present specification, the terms "button" and "key" may be considered synonymous, unless the context
20 clearly indicates otherwise.

Internally, in addition to processor **202** and DSP **204**, phone **100** also includes non-volatile memory **206**, general purpose input/output (GPIO) interface **208**, and transmit/receive (TX/RX) **212**, coupled to each other, processor **202** and DSP **204**, via bus **214**, and disposed on a circuit board **220**.

25 Except for the novel manner that many of these elements, such as processor **202**, DSP **204** and so forth, are used in support of making the

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expanded/full set of functionalities available only to an authenticated user, the enumerated elements otherwise perform their conventional functions known in the art.

Non-volatile memory **206** is employed to store programming instructions and optionally, working data, including operating logic **240** and its security function **242**. Working data may include callee/messaging party or parties (e.g. their phone numbers or IP addresses) with whom user may communicate. Working data may include the reference and input photographs of the user.

Processor **202**, assisted by DSP **204**, is employed to operate phone **100**, executing operating logic **240**, including security function **242**.

Keys of key pad **102** may be employed to enter alphanumeric data, including entering a sequence of alphanumeric data for the phone number or address of a "callee". Selected sequence of the keys (such as "*"#") may also be employed to denote a user instruction to return to the unauthenticated mode of operation, if entered while operating in the authenticated mode of operation, or to return to the authenticated mode of operation, if entered while operating in the unauthenticated mode of operation (provided the user is authenticated).

Scroll key **105** and companion selection keys **106** may be employed to scroll and select various options or list items of various menu options or selection lists, including scrolling and selecting list items presented for user interactions to verify the user's wellness. For the embodiment, scroll key **105** may be selected in one of two positions, an "up" position or a "down" position for scrolling a selection list in an "up" direction and a "down" direction respectively. Similarly, scroll and selection keys **105/106** may also be employed to select a menu item to convey a user instruction to return to the unauthenticated mode, if the selection is made while operating in the authenticated mode, or to return to the authenticated

mode, if the selection is made while operating in the unauthenticated mode (provided the user is authenticated).

GPIO 208 may be employed to generate input signals, such as a corresponding "alphanumeric" signal in response to a user selection of one of the
5 keys of key pad 102, a "scroll" signal" (or more specifically, a "scroll up" or a "scroll down" signals) in response to a user selection of scroll key 105, a "selection" signal in response to a user selection of select button 106, and so forth.

TX/RX 212 may be employed to transmit and receive communication
10 signals for a call and/or a text message. TX/RX 212 may be a radio frequency transceiver, and support one or more of any of the known signaling protocols, including but are not limited to CDMA, TDMA, GSM, and so forth.

The constitutions of these elements are known, and will not be further described.

15 As to operating logic 240, including security function 242, it may be implemented in the assembly or machine instructions of processor 202, or a high level language that can be compiled into these assembly or machine languages. In alternate embodiments, all or portions of operating logic 240, including security function 242 may be implemented in firmware and/or hardware.

20 Accordingly, except for the enhancements provided, phone 100 otherwise represents a broad range of wireless mobile phones, including both the analog as well as the digital types (of all signaling protocols), substantially rectangular uni-body as illustrated, or curved uni-body, as well as multi-portions, such as "flip phones" to be illustrated later.

25

Figure 4 illustrates the operational flow of the relevant aspects of operating logic **240**, in accordance with one embodiment. As illustrated, on start up/reset (such as depression of power on/off button **122** for the required predetermined duration by a user), operating logic **240** enables phone **100** to
5 operate in the earlier described unauthenticated mode, making available only a limited/reduced set of functionalities, block **402**. Thereafter, operating logic **240** waits for additional user input, block **404**.

Recall from earlier description, upon depression by a user, while phone **100** is in powered down or low power state, power switch **122** couples power to
10 camera **122** and other components **202-212** of phone **100**. For the embodiment, on power on/reset, operating logic **230** causes camera **132** to automatically take a photograph of the objects in view. Resultantly, a photograph of an authorized user who is aware of the authentication requirement, and have properly position his/her face in front of the camera, would have a photograph of the user taken or
15 captured in real time, for authentication.

Accordingly, under the present invention, photograph based authentication is seamless integrated with the power on/reset process.

While typically, the authentication process employs photographs that are front views of a user's face, in alternate embodiments, the present invention may
20 be practiced with the authentication process employing photographs that are side views of a user's face, or other views.

Continuing to refer to **Fig. 4**, on receipt of inputs, operating logic **240** determines if the input is a photograph captured by camera **132** in real time (more specifically, by DSP **204**, after it processes the signals output by camera
25 **132** into a photograph), block **406**.

If the user input is photograph, operating logic 240 (or more specifically, security function 242) further determines if phone 100 is operating in the unauthenticated mode, within the authenticated mode (including whether it is within the configuration mode of the authenticated mode), or the initial provisioning mode, block 407.

If phone 100 is determined to be operating in the authenticated mode, the processing is turned over to a camera function (not shown), which handles the photograph in an application dependent manner, block 408. In other words, the user is using camera 132 for its primary purpose, taking photographs/pictures for the user.

If phone 100 is determined to be operating in the configuration mode within the authenticated mode, or the initial provisioning mode, operating logic 240 (or more specifically, security function 242) saves the captured photograph as a reference photograph for future user authentication, block 408.

If phone 100 is determined to be operating in the unauthenticated mode, operating logic 240 (or more specifically, security function 242) initiates the photograph based authentication process, authenticating the user by comparing the real time captured photograph, against the previously saved reference photograph, block 409.

If the photograph does not substantially match the previously saved reference photograph, block 410, operating logic 240 (or more specifically, security function 242) reports the authentication failure, block 412, and continues to operate phone 100 in the unauthenticated mode at block 404.

However, if the inputted photograph substantially matches the previously saved reference photograph, block 410, operating logic 240 (or more specifically,

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security function 242) enables phone 100 to operate in the authenticated mode, block 414. Thereafter, operating logic 240 continues operation at block 404.

5 The precision level at which a real time captured photograph is to be considered substantially matching with a reference photograph is application dependent. Preferably, different user selectable precision levels are offered. As with other user selectable options, the selection may be facilitated in any one of a number of known user selection techniques.

10 Back at block 408, if the input is determined not to be photograph input, operating logic 240 determines if the input is a user instruction to return to the unauthenticated mode of operation (e.g. a user selecting or inputting such command using alphanumeric keys 102 and/or scroll/select keys 105 and 106 while operating in an authenticated mode of operation), block 416.

15 If the input is determined to be a user instruction to return to the unauthenticated mode of operation, operating logic 240 (or more specifically, security function 242) returns phone 100 to operate in the unauthenticated mode, block 418. Thereafter, operating logic 240 continues operation at block 404.

20 In one embodiment, before exiting to the unauthenticated mode, operating logic 240 (or more specifically, security function 242) causes a user selectable "resume" (i.e. re-authentication) option to be rendered on display 108. Selection of the option is processed as if phone 100 is being powered on or reset. That is, operating logic 240 automatically causes camera 132 to capture another photograph of the objects in view for authentication purpose.

25 If the input is determined to be other user inputs, operating logic 240 handles the other user inputs in an application dependent manner, block 420. In particular, if the input is a user instruction to return to the authenticated mode of operation, operating logic 240 continues operation at block 404, and awaits for

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another photograph input to re-authenticate the user. If the input is other conventional inputs, the inputs are processed as in the prior art. Thereafter, operating logic 240 continues operation at block 404.

5 **Figure 5** illustrates another embodiment of the wireless mobile phone of the present invention. More specifically, **Fig. 5** illustrates a front view of the alternate embodiment. The alternate embodiment is substantially that of the embodiment of **Fig. 1**, except that phone 100 is substantially rectangular in shape, whereas phone 500 has a curved shape. Also, camera 532 is disposed
10 at a side of the front surface of body 516 of phone 500 instead.

Figures 6a-6b illustrate yet another embodiment of the wireless mobile phone of the present invention. More specifically, **Fig. 6a-6b** illustrate two perspective views of the embodiment. The embodiment is also substantially that
15 of the embodiments of **Figs. 1** and **5**, except that phone 100 is substantially rectangular, phone 500 has a curve shaped body, whereas phone 700 has a multi-section body. The multi-section form factor includes a first section 716b and a second section 716c, and the second section 716c is further comprised of at least two sub-sections 716d-716e. The first and second sections 716b-716c
20 may pivot towards each other as denoted by direction arrow 706a or away from each other opposite to the direction denoted by arrow 706a. Sub-section 716d may rotate relative to sub-section 716e as denoted by the directions denoted by arrows 706b. In other words, phone 700 may be considered as an improved version of what is commonly referred to as "flip" phones.

25 Similar to the earlier described embodiments, phone 700 is provided with operating logic having a security function as earlier described, and camera 732.

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In yet other embodiments, the reference photograph may be further protected via an authentication protocol, requiring wireless mobile phone 100 to be equipped with the appropriate credential to authenticate itself to smart card 744, before being allowed by smart card 744 to access the pre-stored reference
5 photograph in smart card 744.

In yet other embodiments, the reference photograph may be imprinted on identity card 742, and identity card reader 720 is an optical reader.

In yet still other embodiments, the reference photograph may be encoded via a magnetic strip disposed on a surface of identity card 742, and identity card
10 reader 720 is a magnetic code reader.

These are just a few example, other equivalent encoding/storing and reading/retrieving techniques may also be employed instead.

Conclusion and Epilogue

15 Thus, it can be seen from the above descriptions, a novel wireless mobile phone that can afford protection against unauthorized access to user data and/or usage of the phone has been described.

While the present invention has been described in terms of the foregoing embodiments, those skilled in the art will recognize that the invention is not
20 limited to the embodiments described. The present invention can be practiced with modification and alteration within the spirit and scope of the appended claims.

In particular, the present invention may be practiced with employing additional and/or other means to authenticate a user.

25 Thus, the description is to be regarded as illustrative instead of restrictive on the present invention.

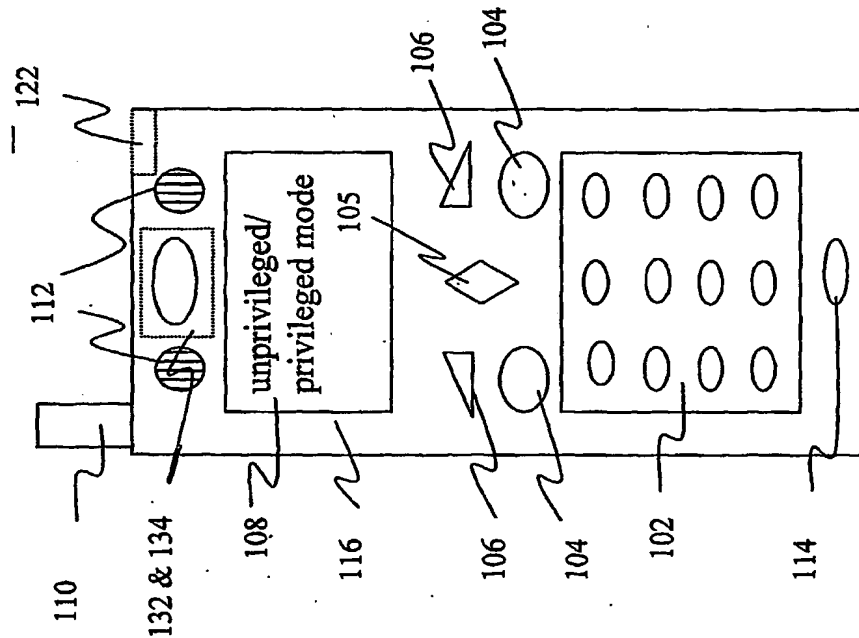


Figure 1

Attorney's Docket No.: 109909-132416
 Inventor(s): Engstrom et al.
 For: A Wireless Mobile Phone With Authentication Mode of Operation Including Photo
 Based Authentication
 Express Mail Label No. EL692649042US

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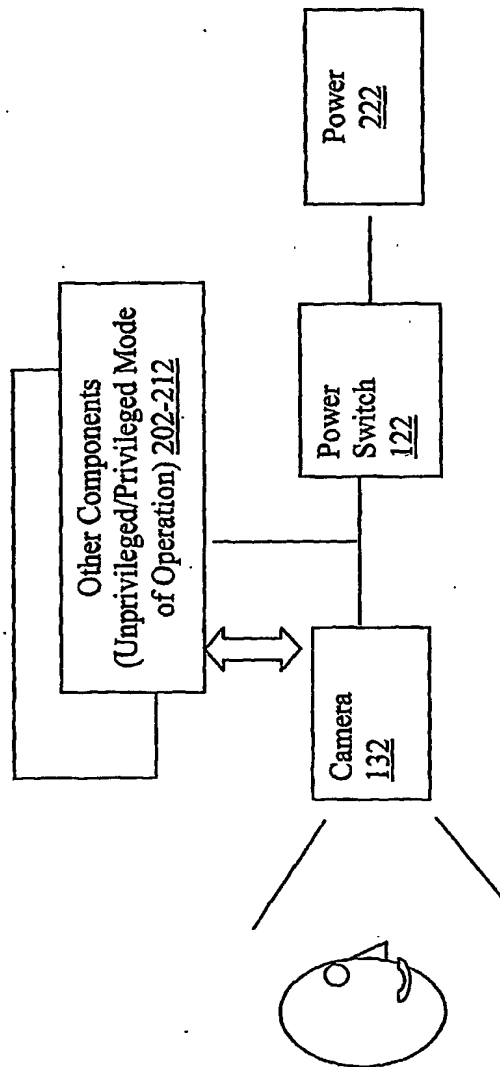


Figure 2

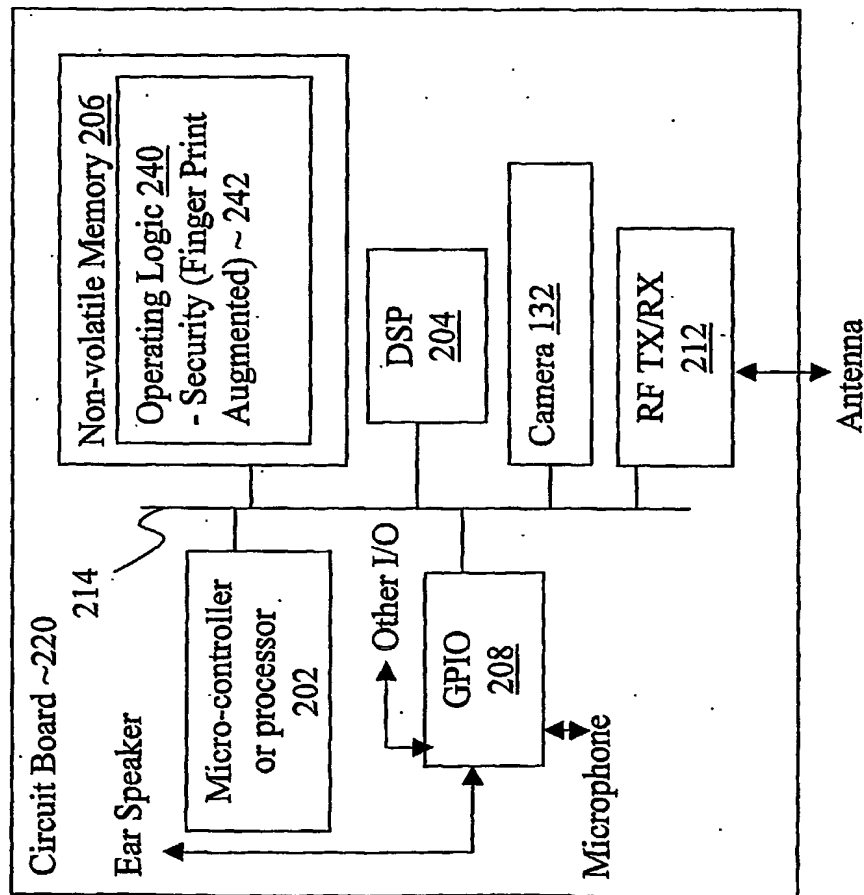


Figure 3

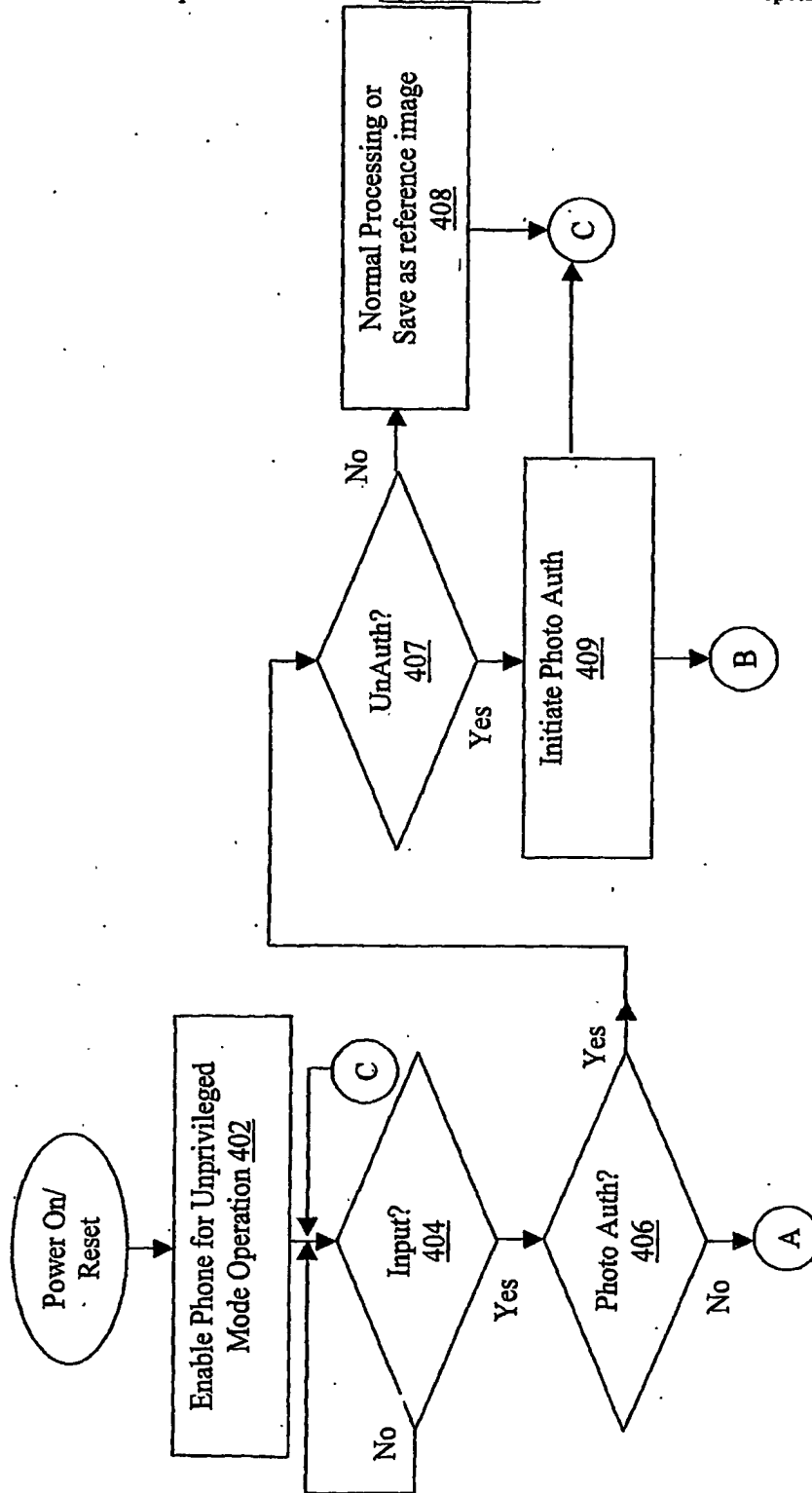


Figure 4a

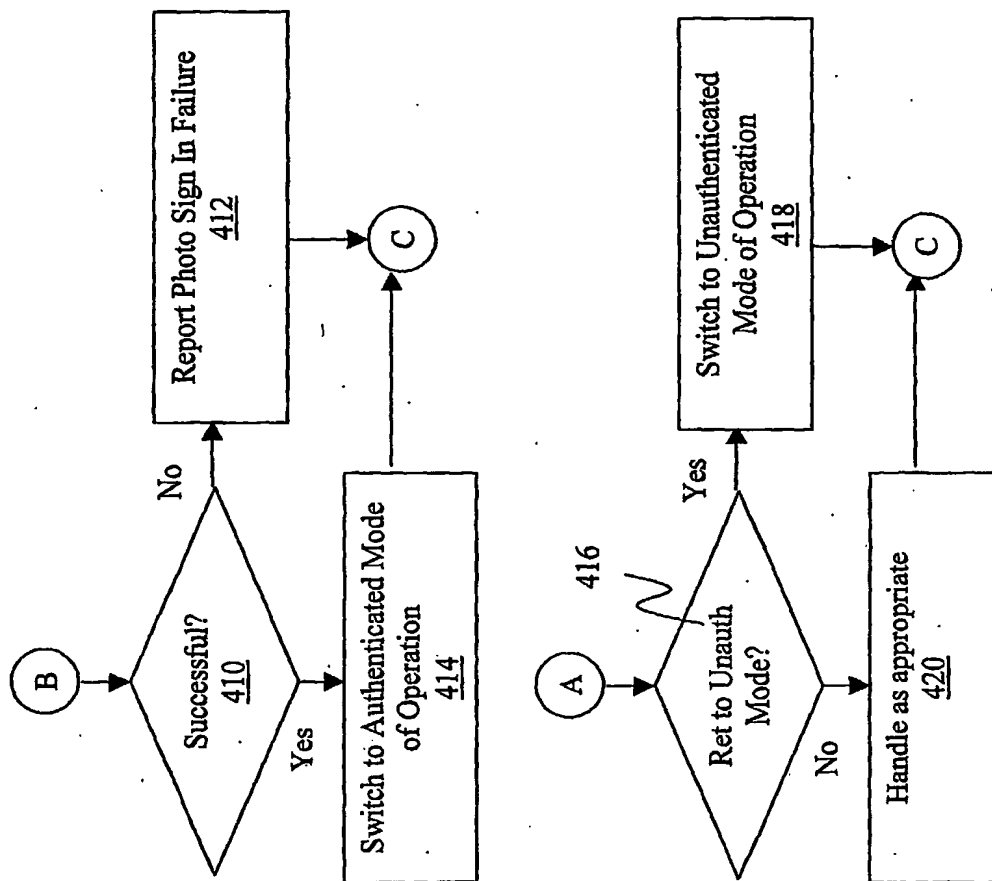


Figure 4b

Attorney's Docket No.: 109909-132416
 Inventor(s): Engstrom et al.
 For: A Wireless Mobile Phone With Authentication Mode of Operation Including Photo
 Based Authentication
 Express Mail Label No. EL692649042US

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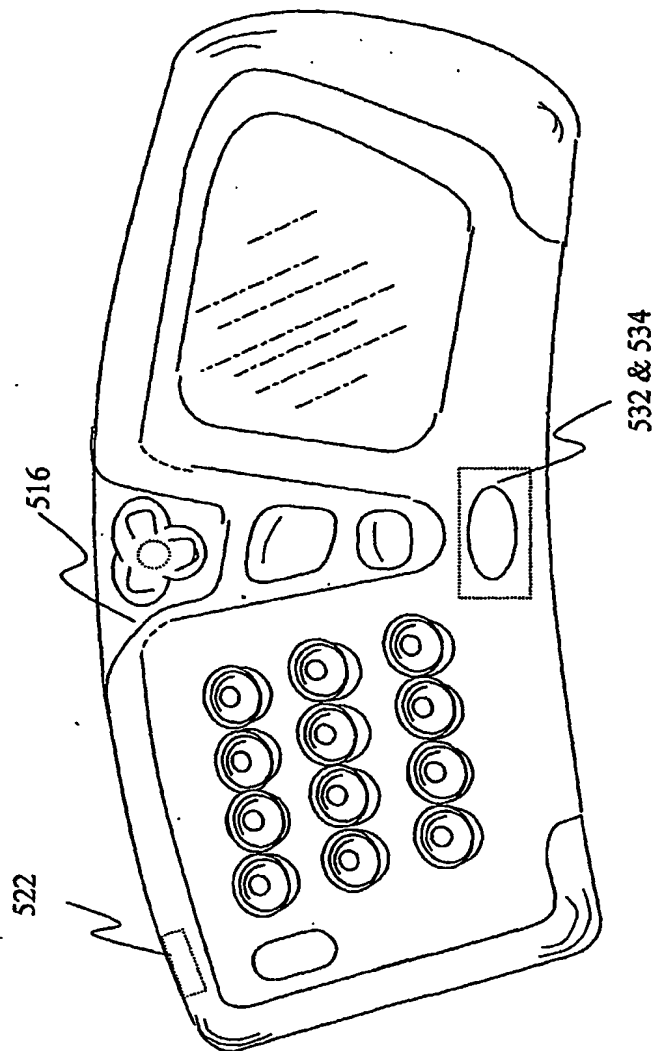


Figure 5

500

Attorney's Docket No.: 109909-132416
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 For: A Wireless Mobile Phone With Authentication Mode of Operation Including Photo
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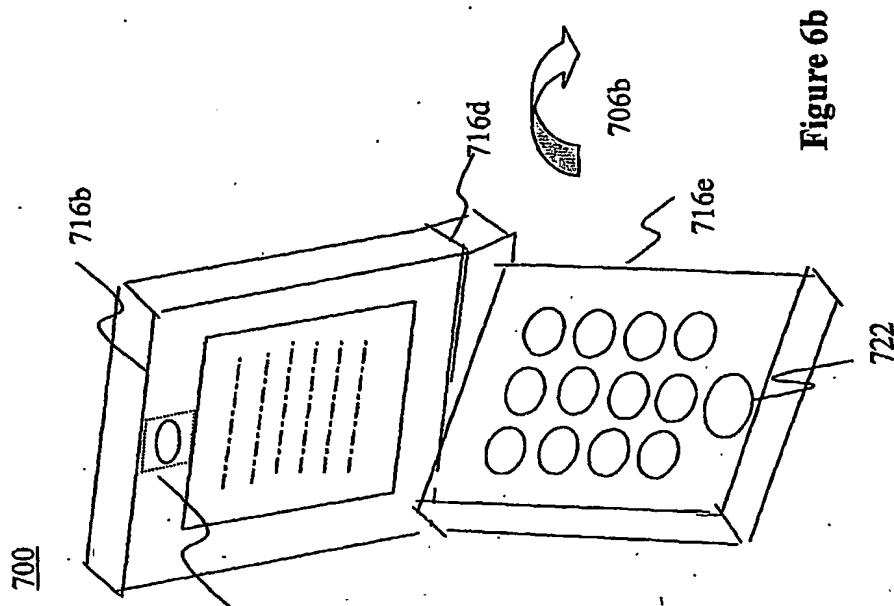


Figure 6b

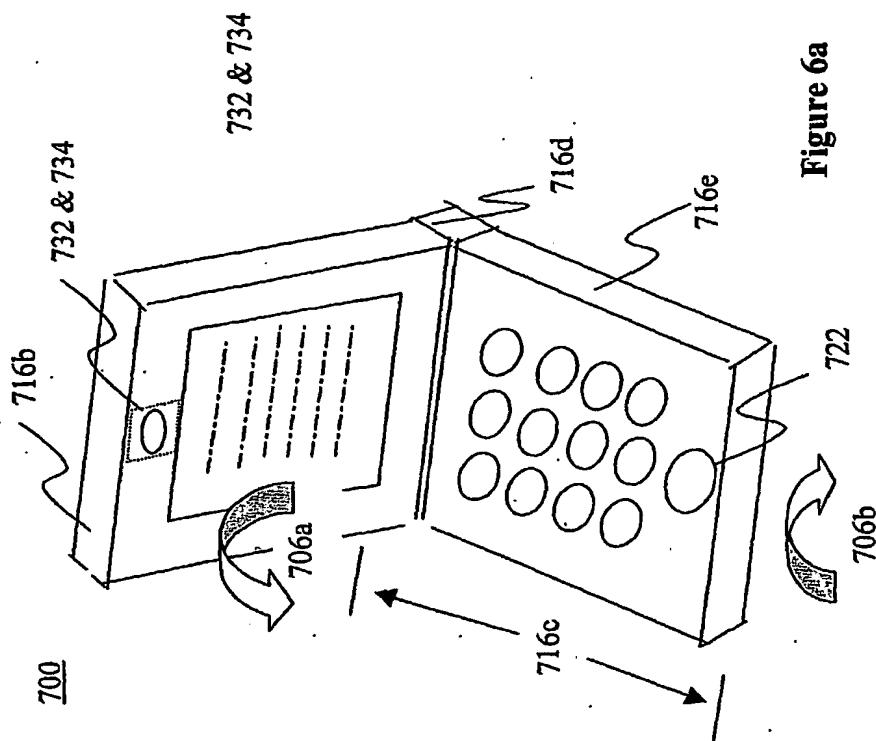


Figure 6a

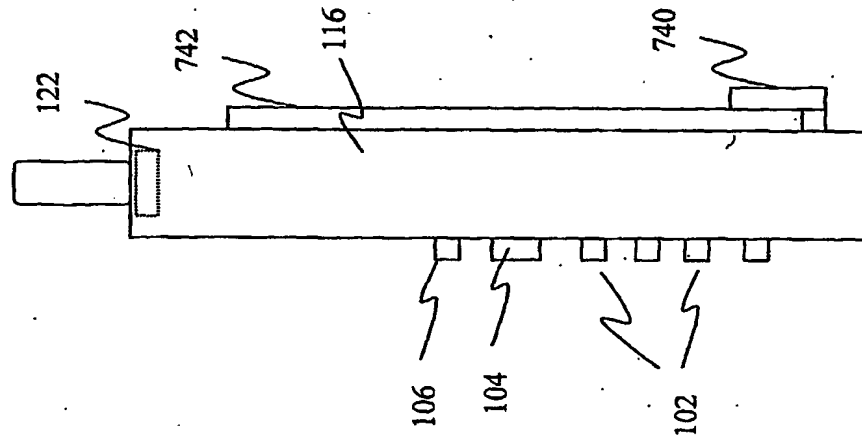


Figure 7b

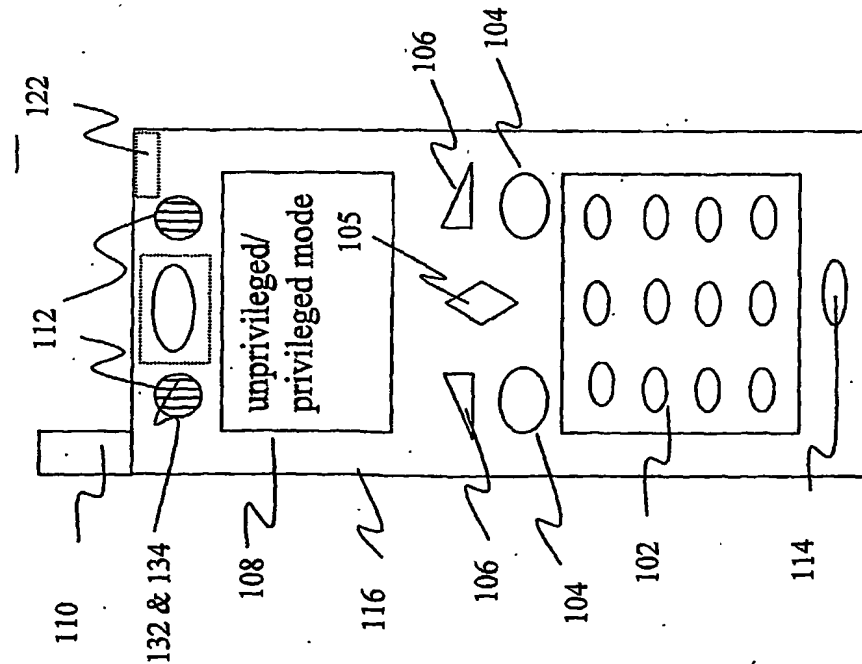


Figure 7a

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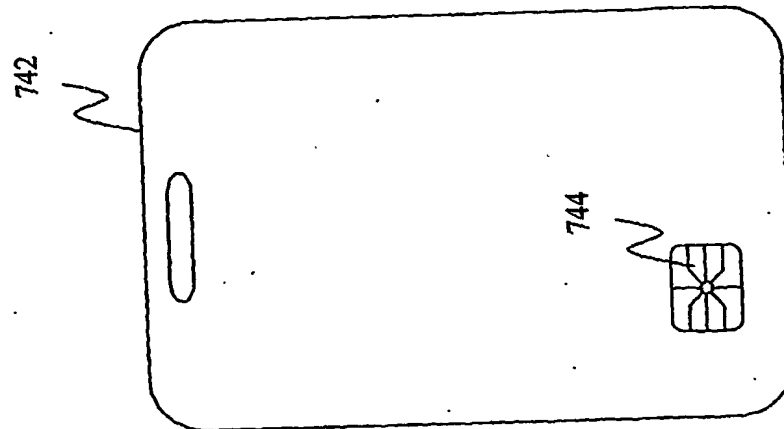


Figure 8b

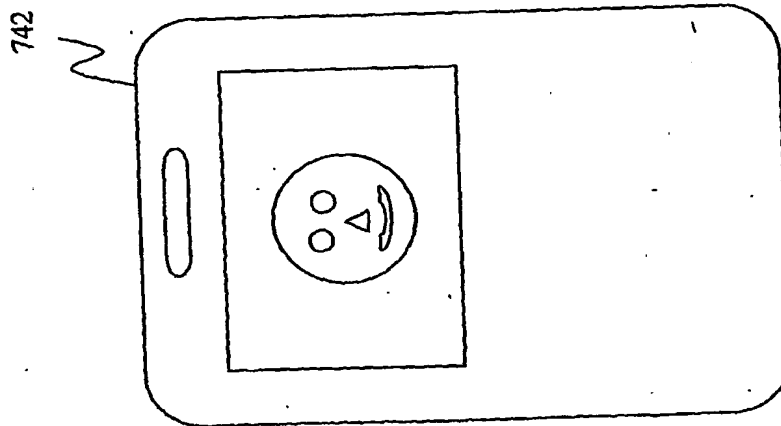


Figure 8a

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